PATENT ABSTRACTS OF JAPAN

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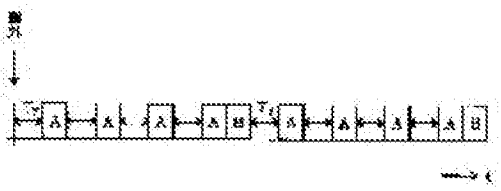
(54) OUT-OF-OZONE WAITING METHOD FOR MOBILE COMMUNICATION

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce power consumption without delaying the time of transition from out-of-zone state to awaiting state so much.

SOLUTION: When a mobile station is moved from an awaiting zone to outside the zone of a home mobile communication network to which that mobile station is belongs or a roam mobile communication network in which roaming is permitted, while intermittently turning on the power source of a reception system circuit of a radio unit, the controller of the mobile station intermittently executes a catch operation A for a control channel to be waited for in the home mobile communication network and a catching operation B for a control channel to be waited for in the roam mobile communication network. In this case, the catching operation A for the control channel to be waited for in the home mobile communication network is performed more frequently than the catching operation B for the control channel to be waited for in the roam mobile communication network and when the control channel is caught, the mobile station is changed to the waiting state.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the waiting receptacle method for the outside of the circle of mobile communications, especially it is related with the waiting receptacle method for the outside of the circle of mobile communications usable in the both sides of a loam entrepreneur mobile radio communication network to which roaming is permitted although the home entrepreneur mobile radio communication network with which it has joined and entrepreneur of this mobile station differ from each other in a mobile station.
[0002]

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TECHNICAL FIELD

[Industrial Application]This invention relates to the waiting receptacle method for the outside of the circle of mobile communications, especially it is related with the waiting receptacle method for the outside of the circle of mobile communications usable in the both sides of a loam entrepreneur mobile radio communication network to which roaming is permitted although the home entrepreneur mobile radio communication network with which it has joined and entrepreneur of this mobile station differ from each other in a mobile station.

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PRIOR ART

[Description of the Prior Art]If the telephone call connection by the remarkable cellular phone of spread is explained in recent years according to standards ("foundation Research & Development Center for Radio System issue, digital system automobile telephone system standards RCRSTD-27 refer to each revised edition of decision and A-D of this on April 30, Heisei 3), it will be made as follows. as for the carrier reception of a quota **** cage and many, in the case of a three-channel multiplex TDMA system, much carrier reception frequency forms in mobile communications the control channel for which a mobile station receives various control information from a base station in the group of the slots 2 and 5 of a reception frame. In order to consider it as the key at which the group of the slots 2 and 5 of a reception frame calls it ball tree frequency in the frequency of the main carrier receptions used as a control channel, awaits in a power up or a case outside the circle, and looks for a control channel, it has memorized in the memory of the mobile station. It is called a ball tree channel in the group of the slots 2 and 5 of the reception frame in set up tree frequency. After powering on, await a mobile station with a set up tree channel scan, it awaits by performing channel selection operation, catches and awaits a control channel, and will be in a state (it awaits and changes). First, a receiving level looks for the set up tree channel beyond default value to a mobile radio communication network, making it align with each set up tree frequency in order (ball tree channel scan), next, order with a high receiving level -- a set up tree channel -- it aligning, and it awaiting, and the propriety judging of formation of a starting condition being performed (a starting condition is mentioned later), and, A set up tree channel (or control channel of these others when other control channels are specified by control information) when it awaits and all starting conditions are satisfied is awaited, and it is considered as a control channel (awaiting channel selection operation). And if required, location registration will be required from a mobile radio communication network. It will answer, if it awaits from a mobile radio communication network and receipt occurs through the paging channel (simultaneous call

channel) PCH among control channels, It switches to the traffic channel (information channel) TCH specified by the single-cells channel (channel for individual cells) SCCH, and a calling sound is emitted. It is off-hook and a speech path is set up (receipt). If off-hook is carried out with the mobile station which awaits and is in a state, a call request is carried out after checking the opening of SCCH and there is a response, it will switch to TCH specified by SCCH, and a speech path will be set up after transmitting a dial signal (call origination). If on hook is carried out during a telephone call in a mobile station or a base station (net side) or a receiving level falls below in predetermined default value, clear back processing will be carried out, origin will await, and it will await by a control channel (clear back).

[0003]a mobile station is new noting that it will come out to the outside of the circle of a mobile radio communication network, if await and the receiving level from the base station of a ** area zone awaits to inside, it is less than a degradation level, the receiving level from the base station of peripheral zones is also awaited and it becomes below a permission level -- it awaits and a control channel is caught (waiting receptacle for the outside of the circle). The set up tree frequency memorized by the memory is specifically scanned first, a receiving level matches the set up tree channel and receiving level beyond default value, and it memorizes as a channel for selection (ball tree channel scan). Next, alignment, an establishes synchronization, error detection/correction, receiving level detection, and the broadcasting channel (notice information channel) BCCH are received, aligning order with a high receiving level with the channel for selection memorized in the memory this time. And the layer 1 (it is a layer which guarantees transmission of a bit string using the communication circuit which uses electromagnetic waves as a physical transmission medium, and) which is the physical layer of the signal system between non-railroad sections between the mobile station-base stations seen with 7 hierarchical models of OSI (Open Systems Interconnection) The establishes synchronization of a frame and a super frame, color code detection, and starting of a scrambler, error detection/correction -- carrying out -- it checking (awaiting above starting condition), and whether it is working normally, reception of BCCH was completed, or the receiving level awaited, and it became larger than a permission level, if there is a set up tree channel materialized altogether, This is awaited, and it awaits as a control channel, and goes into a state (it switches, when [which becomes settled for the control channel structure information on BCCH] it awaits and control channels differ). When the layer 1 does not work normally, or a receiving level awaits about all the channels for selection memorized in the memory and below a permission level becomes this time, it returns to a set up tree channel scan. Thus, it awaits, and in the state, it was transmitted from the nearby highest base station of a receiving level among mobile radio communication networks, and awaits, and a control channel can be caught, Execution becomes possible with small power about communication with a base station (it awaits, and awaits in BCCH of a control channel, the identification

information of a permission level and a mobile radio communication network, a location registration area number, control channel structure information, regulation information, etc. are received, and a receipt signal is received in PCH).

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a block diagram showing one example of the mobile station which embodied the waiting receptacle method for the outside of the circle of the mobile communications concerning this invention.
[Drawing 2]It is an explanatory view showing the time schedule at the time of the waiting receptacle for the outside of the circle.
[Drawing 3]It is a flow chart which shows operation of a controller.
[Drawing 4]It is a flow chart which shows operation of a controller.
[Drawing 5]It is an explanatory view of the waiting receptacle operation for the outside of the circle.
[Drawing 6]It is an explanatory view of the conventional waiting receptacle operation for the outside of the circle.
[Description of Notations]
1 Operation/indicator Five Antenna
6 Radio unit 6B Receiving circuit
6C Demodulator 7 TDMA circuit
8 Controller
Z_1, Z_2 mobile station

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]When a mobile station is in the place which the electric wave of the home entrepreneur mobile radio communication network with which this mobile station has joined does not reach, however it may await and may perform control channel prehension operation, it cannot catch on misfire. Therefore, in order to prevent rapid consumption of a cell, intermittently, and it is made to perform prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network intermittently. [the power supply of the receiving system circuit of a mobile station] However, since there is inconvenience that the state where it awaits immediately and does not shift to a state even if it moves to the place which an electric wave reaches, and it cannot telephone continues when power OFF time (dormant period T_Y) of a receiving system circuit is lengthened not much, it is set as about several seconds (refer to drawing 6 (1)). by the way, when the mobile station is permitted use (roaming -- being concerned -- others -- an entrepreneur mobile radio communication network is called loam entrepreneur mobile radio communication network) with other arbitrary entrepreneur mobile radio communication networks which have not carried out the participating contract directly and it becomes outside the circle, Since there is no telling any shall be caught between a home entrepreneur mobile radio communication network and a loam entrepreneur mobile radio communication network, both prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network, and prehension operation of the control channel which should be awaited with a loam entrepreneur mobile radio communication network must be carried out. As shown in drawing 6 (2), at this time Prehension operation with a home entrepreneur mobile radio communication network, When a time schedule called prehension operation with a loam entrepreneur mobile radio communication network and a pause was repeated, compared with drawing 6 (1), the energization ratio of the receiving system circuit became high, consumption of a cell was

intense, and awaited, and there was a problem to which temporal duration becomes extremely short. If T_Y is extended and an energization ratio is lowered in order to solve this problem, it will await and the transition time to a state will start for a long time.

[0005]This invention sets it as the purpose to provide the waiting receptacle method for the outside of the circle of the mobile communications which enabled it to hold down power consumption low, without awaiting from the outside of the circle and delaying the transition time to a state so much in view of the problem of the above-mentioned conventional technology.

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MEANS

[Means for Solving the Problem]When a mobile station awaits to a loam entrepreneur mobile radio communication network to which a home entrepreneur mobile radio communication network or roaming of this mobile station which has joined is permitted and changes into an outside-of-the-circle state from a state in a waiting receptacle method for the outside of the circle of mobile communications of this invention, Intermittently, [all or a part of power supplies of receiving system circuits of a mobile station] Prehension operation of a control channel which should be awaited with a home entrepreneur mobile radio communication network, and prehension operation of a control channel which should be awaited with a loam entrepreneur mobile radio communication network are performed intermittently, Under the present circumstances, when it is made to perform prehension operation of a control channel which should be awaited with a home entrepreneur mobile radio communication network by frequency higher than prehension operation of a control channel which should be awaited with a loam entrepreneur mobile radio communication network and prehension of a control channel is completed, it is characterized by awaiting and shifting to a state.

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OPERATION

[Function]When a mobile station is in an outside-of-the-circle state according to the waiting receptacle method for the outside of the circle of the mobile communications of this invention, Intermittently. [all or a part of power supplies of the receiving system circuits of a mobile station] Prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network, and prehension operation of the control channel which should be awaited with a loam entrepreneur mobile radio communication network are performed intermittently, Under the present circumstances, when it carries out by frequency higher than prehension operation of the control channel which should be awaited with a loam entrepreneur mobile radio communication network and prehension of a control channel is completed, prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network is awaited, and shifts to a state. Since prehension operation of the control channel of a home entrepreneur mobile radio communication network is made by high frequency per unit time when a mobile station is in the service area of a home entrepreneur mobile radio communication network, It awaits from an outside-of-the-circle state, even if it compares the transition time to a state with the mobile station which does not have a roaming function, it is not delayed so much, and a user is not kept waiting so long until it can telephone. When the service area of a home entrepreneur mobile radio communication network and a loam entrepreneur mobile radio communication network has lapped, convenience is high for a user from the field of enjoyment of communication charges and various services by priority being given to a home entrepreneur mobile radio communication network. Even when the service area of a home entrepreneur mobile radio communication network and a loam entrepreneur mobile radio communication network has not lapped, since it is thought that a user uses a mobile station with a home entrepreneur mobile radio communication network in many cases, it does not need to be kept waiting, by the time it awaits from an outside-of-the-circle state and will be in a state. Since

prehension operation of the control channel of a loam entrepreneur mobile radio communication network can be ensured even when a user is in the place which can communicate only with a loam entrepreneur mobile radio communication network, roaming use can be performed. Since the frequency of prehension operation of the control channel of a loam entrepreneur mobile radio communication network is low, power consumption can be held down low, and can be awaited and temporal duration can be kept long.

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EXAMPLE

[Example]
Entire configuration drawing 1 is a block diagram showing the composition of one example of the mobile station (cellular phone) which embodied the waiting receptacle method for the outside of the circle of the mobile communications concerning this invention. Here, a mobile station makes usable loam entrepreneur either the home entrepreneur mobile radio communication network (henceforth a home network) with which this mobile station has joined or mobile radio communication network (henceforth a loam network) to which roaming is permitted. While 1 is provided with various keys, such as a power key, an off-hook key, and a dialing key, Operation/indicator provided with the display for indication which performs the various displays of an outside-of-the-circle display, a receiving level display, dial indicating, a dead battery display, etc., 2 a microphone and 3 a loudspeaker and 4 Voice coding / decryption machine (CODEC), 5 is an antenna, and 6 is a radio unit (RFU), and The transmission-and-reception common machine 6A, Amplification of an antenna received signal, frequency conversion, the receiving circuit 6B that carries out IF amplification, The frequency synthesizer 6F which outputs the local oscillation signal for the demodulator (pi / 4 shift QPSK demodulation machine) 6C, the modulator (pi / 4 shift QPSK modulation machine) 6D, the sending circuit 6E that carries out the frequency conversion and power amplification of a modulator output, frequency conversion, etc. is included. One [control of the controller mentioned later / the power supply of each circuit except the transmission system circuit (the modulator 6D and the sending circuit 6E) of the radio unit 6] intermittently when performing intermittent reception. One [the power supply of a transmission system circuit] only when transmission is required. The receiving level detector (not shown) is also built in the receiving circuit 6B.
[0009]7 is a TDMA circuit (Time Division Multiplexing/separation circuits), and combines information data, synchronous words, etc., such as control channel data for transmission, and

voice data, Store in the predetermined time slot in a TDMA frame, and carry out a burst output to the modulator 6D, or, While extracting a required time slot from the TDMA frame inputted from the demodulator 6C and taking a frame synchronization and a super frame synchronization, starting of color code detection and a scrambler, error detection/correction, etc. are performed, and it outputs according to control channel data and voice data. This TDMA circuit 7 also has the synchronizing detection function of a frame and a super frame to the received slot, and the detection function of whether error detection/correction is normal. The program which 8 is the controller which comprised a microcomputer and was memorized by the internal memory, an own machine type number, Using the information etc. which identify a home network, each set up tree channel frequency of a loam network and a home network, and a loam network by carrying out control and the various judging processes of each part of a mobile station. It awaits and usual [after control channel prehension] awaits, and control management, such as a waiting receptacle for the outside of the circle to powering on, home network, and loam network according to operation of a power key, receipt and the call origination accompanying an off-hook key and dialing key operation, and clear back, is performed, delivering and receiving various control information between base stations.

[0010]In this example, when awaiting in the state of the outside of the circle and carrying out, the controller 8 carries out prehension motion control of the control channel which should give priority to a home network, and should await and carry out it. . Namely, taking the dormant period of T_Y second, as shown in drawing 2, intermittently, and make the prehension operation of a control channel of a home network which should be awaited and carried out perform 1 time respectively during each "on" period. [the power supply of the radio unit 6 (except for a transmission system circuit)] Prehension operation of the control channel of a loam network which should be awaited and carried out is made to perform by the frequency of 1/n (n is two or more integers) of a home network. At the place with which the service area of a home network and a loam network has lapped, the direction of home priority has a merit in respect of communication charges, answering machine service, a call forwarding service, etc.

[0011]The flow chart which shows the processing after powering on according [drawing 3] to the controller 8, the flow chart with which drawing 4 shows the waiting receptacle processing for the outside of the circle, and drawing 5 are the explanatory views of the waiting receptacle operation for the outside of the circle, and explain the waiting receptacle operation for the outside of the circle of this example with reference to these figures hereafter. Here, although the frequency band of a home network differs from the frequency band of a loam network, a service area assumes that it has lapped (refer to drawing 5.). Numerals Z_1 in the figure and Z_2 show a mobile station. Use shall be permitted and loam either a home network or a network sets a mobile station to n= 4 for T_Y= 2 seconds. Status flag AF is set to 0 when only a home

network performs as an object prehension operation of the control channel which should be awaited (fixed mode), and when carrying out for both a home network and a loam network, it is set to 1 (variable mode).

[0012]Now [powering-on] as that whose mobile station is in the place which can receive the electric wave of a home network, If a power key is pressed by operation / indicator 1 (Step S1), and the controller 8 will set AF to one, and will make it variable mode (Step S2). [the radio unit 6 (except for a transmission system circuit), the TDMA circuit 7, etc.] [the power supply of each part] Next, prehension motion control of the control channel which should be awaited with a home network is carried out (Step S3). Specifically receiving tuning control is carried out to the radio unit 6, the set up tree frequency of the home network memorized by the internal memory is scanned, a receiving level matches the set up tree channel and receiving level beyond default value, and it memorizes as a channel for selection (ball tree channel scan). Next, making it align with order with a high receiving level to this channel for selection, the establishes synchronization of a frame and a super frame, starting of a scrambler, and error detection/correction are performed in the TDMA circuit 7, and control channel data is made to output. And the synchronization is detected and error detection/correction is also made normally in the (1) TDMA circuit 7 (the layer 1 should be working normally), (2) each information on BCCH in a control channel (awaiting -- the identification information of a permission level and a mobile radio communication network.) A location registration area number, control channel structure information, regulation information, etc. have received correctly, (3) By BCCH, the receiving level was defined, awaits and is larger than a permission level, (4) Whether ** whose identification information of the mobile radio communication network of BCCH corresponds with the identification information of the home network memorized by the internal memory awaits, and all starting conditions are satisfied, and when being checked and (step S4) materialized, it awaits as a control channel which should await and carry out this set up tree channel with a home network, and goes into a state (Step S5). in addition -- as the control channel which should be awaited and carried out when the shift to other control channels is directed by BCCH in this case -- being concerned -- others -- it shifts to a control channel, and it awaits and goes into a state. If it awaits and phenomena, such as call origination and receipt, occur between home networks inside, the controller 8 will perform control according to a phenomenon, such as predetermined call origination control and receipt control, to each part.

[0013]Await with the waiting receptacle (refer to drawing 2 and drawing 5) home network for the outside of the circle, and to inside (Refer to Z_1 of drawing 5). If go to the place which an electric wave does not reach and the receiving level from the base station of a ** area zone awaits, it is less than a degradation level, the receiving level from the base station of peripheral zones is also awaited and it becomes below a permission level, it will progress to the flow of

drawing 4 and waiting receptacle processing for the outside of the circle will be performed noting that the controller 8 comes out to the outside of the circle of a home network. First, status flag AF checks in zero (Step S10), and since it is NO, 0 is used, a scanning object is fixed to a home network, and the enumerated data C of the counter (not shown) which counts the intermittent reception times in fixed mode are cleared (Step S11, S12). And the power supply of the receiving system circuit (the receiving circuit 6B, the demodulator 6C) of the radio unit 6 is turned off only for T_Y= 2 seconds (transmission system circuit with a power OFF state), and the TDMA circuit 7 is stopped as a standby mode which is low-power-consumption mode (Step S13).

[0014]Next, check (Step S14), since it is NO at first, return to Step S3 of drawing 3, and it is made to be completely the same as that of the above-mentioned whether C is smaller than (n-1), Each part except the transmission system circuit of the radio unit 6 is made to supply a power supply, the standby mode of the TDMA circuit 7 is canceled, and prehension operation of a control channel which should be awaited and carried out with a home network is carried out. A mobile station is in the place which the electric wave of a home network does not reach yet, when it is set to NO by step S4, without the ability to catch, status flag AF checks in zero (Step S6), since it is YES, it progresses to S15 through Step S10 of drawing 4, and the enumerated data C of the cow uta are carried out +1. The same processing is repeated and prehension operation of the control channel which should be awaited with a home network is intermittently repeated until it can catch hereafter the control channel which should be awaited with a home network or C amounts to (n-1).

[0015]When C amounts to (n-1), being unable to catch a control channel with a home network, the controller 8 sets status flag AF to one, and makes it variable mode (Step S14, S16). Then, since it is set to NO at Step S6 after prehension operation of the control channel which should be awaited with a home network is made by 1 time (Step S3), It progresses to Step S7 and prehension operation of the control channel which should await and carry out the power supply of the receiving system circuit of the radio unit 6 with a loam network shortly with the standby mode of one and the TDMA circuit 7 canceled is performed (Step S7). Although this prehension operation is almost the same as the case of a home network, only the point which carries out the set up tree channel scan of a loam network first, and the point where whose identification information of the mobile radio communication network of (4)'BCCH (1) - (4) awaits and corresponds (4) in a starting condition with the identification information of the loam network memorized by the internal memory and which is boiled and replaced with are different.

[0016]Then, the controller 8 confirms whether about a loam network, await and all starting conditions are satisfied (Step S8). When a mobile station is in the place which the electric wave of a loam network does not reach and it is set to NO, without the ability to catch, it

progresses to S11 through Step S10, and is again set in fixed mode, and C is cleared (Step S12). And prehension operation of the control channel which should be awaited only for a time and a home network intermittently (n-1) is performed, taking a dormant period 2 second respectively. If a home network and a loam network are continued after this, and prehension operation of a control channel is performed 1 time respectively, if it cannot catch, and it cannot catch yet here, Processing in which prehension operation of the control channel which should be awaited only for a time and a home network intermittently (n-1) is performed is repeated (above, waiting receptacle for the outside of the circle.). Refer to drawing 2.

[0017]Since the prehension operation frequency of a home network is high compared with a loam network when the transition area from the waiting receptacle for the outside of the circle to the waiting receptacle for a home network outside awaits and a mobile station comes for the position which an electric wave reaches about both a home network and a loam network to inside, The probability that the control channel which should be awaited with the home network of Step S3 will be caught is high. therefore -- if the control channel of a home network is caught immediately, it awaits and all conditions are satisfied -- a home network -- it awaits and shifts to a state (step S4, S5). Compared with a loam network, it is advantageous in respect of communication charges and service, and if all can be communicated, a home network is catching a home network and its convenience is high for a user.

[0018]Since prehension operation of the control channel is made at Step S7 also about the loam network when a mobile station comes to the position which an electric wave reaches only in a loam network in the waiting receptacle for the transition outside of the circle from the waiting receptacle for the outside of the circle to the waiting receptacle for a loam network, if the control channel of a loam network is caught, it awaits and all conditions are satisfied -- a loam network -- it awaits and shifts to a state (Step S8, S9). Thereby, communication in the large area in which the roaming function was employed efficiently is attained.

[0019]When control channel prehension operation of a home network is carried out to a power up, it awaits and a starting condition is not satisfied (it is NO at step S4), at first, since AF is 1, it progresses to S7 through Step S6, and prehension operation of the control channel which should be awaited with a loam network is performed. It will await, if it awaits and all starting conditions are satisfied about a loam network, it will be in a state (Step S8, S9), and if not materialized, it shifts to outside-of-the-circle processing of drawing 4.

[0020]When it changes into an outside-of-the-circle state according to this example, intermittently. [the power supply of the radio unit 6] Prehension operation of the control channel which should be awaited with a home network, and prehension operation of the control channel which should be awaited with a loam network are performed intermittently, Under the present circumstances, prehension operation of the control channel which should be awaited with a home network, Since it was made to carry out by frequency higher than

prehension operation of the control channel which should be awaited with a loam network, the frequency of prehension operation of the control channel of a loam network can be low, and can end, power consumption can be held down low, and can be awaited, and temporal duration can be kept long. And since prehension operation of the control channel of a home entrepreneur mobile radio communication network is made by high frequency per unit time when a mobile station is in the service area of a home network, It awaits from an outside-of-the-circle state, even if it compares the transition time to a state with the mobile station which does not have a roaming function, it is not delayed so much, and a user is not kept waiting so long until it can telephone. When the service area of a home network and a loam network has lapped, convenience is high for a user from the field of enjoyment of communication charges and various services by priority being given to a home network. Even when the service area of a home network and a loam network has not lapped, since it is thought that a user uses a mobile station with a home network in many cases, it does not need to be kept waiting, by the time it awaits from an outside-of-the-circle state and will be in a state. Since prehension operation of the control channel of a loam network can be ensured even when a user is in the place which can communicate only with a loam network, roaming use can be performed.

[0021]Although the cellular phone was mentioned as the example and the above-mentioned example explained it, it is applicable also like the mobile communications of other kinds, such as PHS, PDA, MCA, and a pager. Although T_Y was made into 2 seconds, it is good also as other time, such as 1.5 seconds and 3 etc. seconds, and may be made to change T_Y in the middle of the waiting receptacle for the outside of the circle. n may also be made other setting out, such as 3, 5, and 6. It may be made to perform the pause of reception in turning off only some [, such as the receiving circuit 6B,] power supplies among receiving system circuits. The dormant period of the beginning after becoming the outside of the circle may be omitted.

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EFFECT OF THE INVENTION

[Effect of the Invention]When a mobile station is in an outside-of-the-circle state according to the waiting receptacle method for the outside of the circle of the mobile communications of this invention, Intermittently. [all or a part of power supplies of the receiving system circuits of a mobile station] Prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network, and prehension operation of the control channel which should be awaited with a loam entrepreneur mobile radio communication network are performed intermittently, Under the present circumstances, prehension operation of the control channel which should be awaited with a home entrepreneur mobile radio communication network, By carrying out by frequency higher than prehension operation of the control channel which should be awaited with a loam entrepreneur mobile radio communication network, Since prehension operation of the control channel of a home entrepreneur mobile radio communication network is made by high frequency per unit time when a mobile station is in the service area of a home entrepreneur mobile radio communication network, It awaits from an outside-of-the-circle state, even if it compares the transition time to a state with the mobile station which does not have a roaming function, it is not delayed so much, and a user is not kept waiting so long until it can telephone.When the service area of a home entrepreneur mobile radio communication network and a loam entrepreneur mobile radio communication network has lapped, convenience is high for a user from the field of enjoyment of communication charges and various services by priority being given to a home entrepreneur mobile radio communication network. Even when the service area of a home entrepreneur mobile radio communication network and a loam entrepreneur mobile radio communication network has not lapped, since it is thought that a user uses a mobile station with a home entrepreneur mobile radio communication network in many cases, it does not need to be kept waiting, by the time it awaits from an outside-of-the-circle state and will be in a state. Since prehension operation of the control channel of a loam entrepreneur

mobile radio communication network can be ensured even when a user is in the place which can communicate only with a loam entrepreneur mobile radio communication network, roaming use can be performed. Since the frequency of prehension operation of the control channel of a loam entrepreneur mobile radio communication network is low, power consumption can be held down low, and can be awaited and temporal duration can be kept long.

[Translation done.]

* NOTICES *

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]When a mobile station awaits to a loam entrepreneur mobile radio communication network to which a home entrepreneur mobile radio communication network or roaming of this mobile station which has joined is permitted and changes into an outside-of-the-circle state from a state, Intermittently. [all or a part of power supplies of receiving system circuits of a mobile station] Prehension operation of a control channel which should be awaited with a home entrepreneur mobile radio communication network, and prehension operation of a control channel which should be awaited with a loam entrepreneur mobile radio communication network are performed intermittently, Under the present circumstances, prehension operation of a control channel which should be awaited with a home entrepreneur mobile radio communication network, A waiting receptacle method for the outside of the circle of mobile communications awaiting and shifting to a state when it is made to carry out by frequency higher than prehension operation of a control channel which should be awaited with a loam entrepreneur mobile radio communication network and prehension of a control channel is completed.

[Translation done.]

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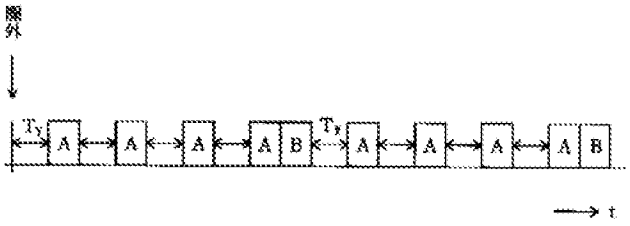
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 2]

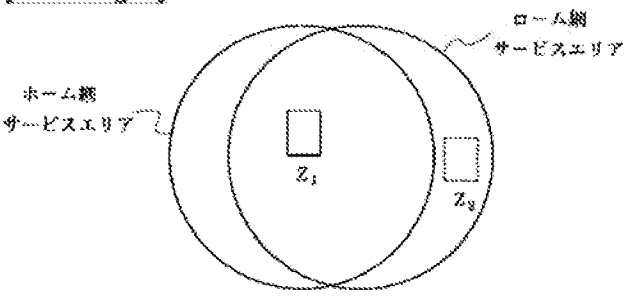


A…ホーム網で待ち受けすべき
制御チャネルの捕捉動作

B…ローム網で待ち受けすべき
制御チャネルの捕捉動作

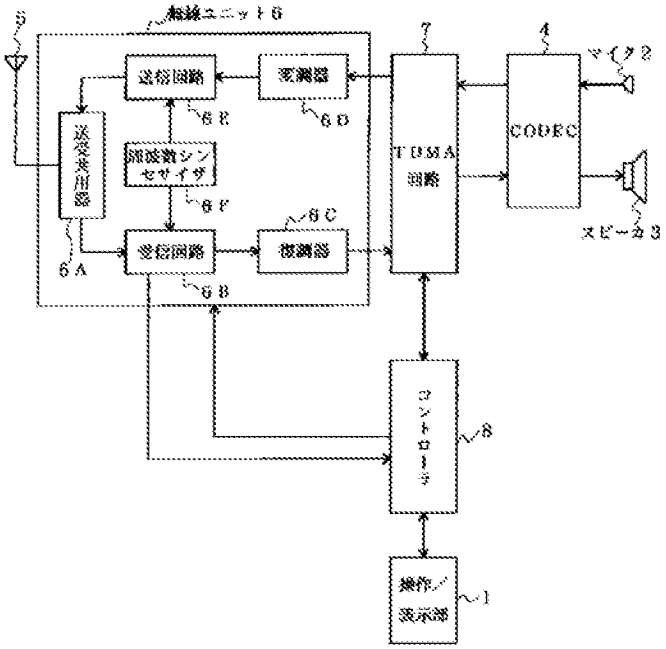
T_Y…休止期間

[Drawing 5]

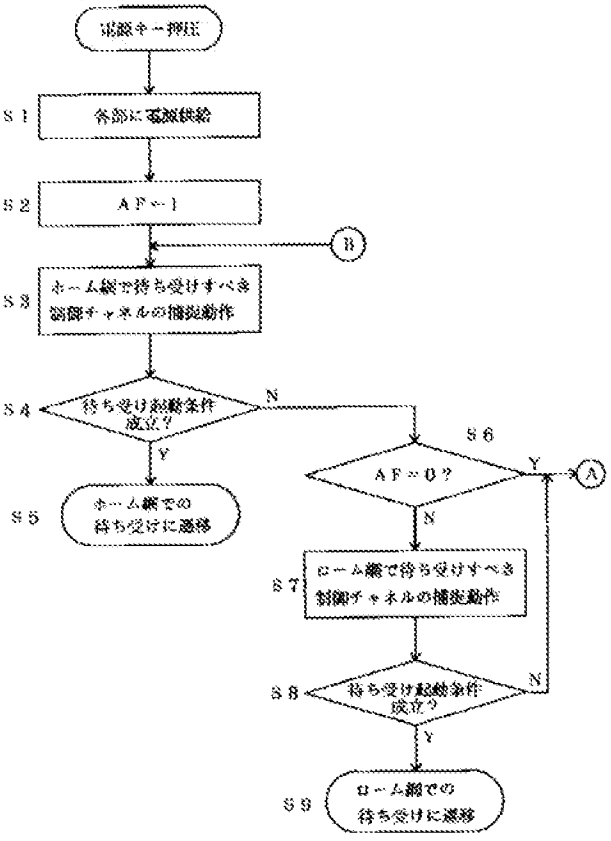


Z_1、Z_2…移動局

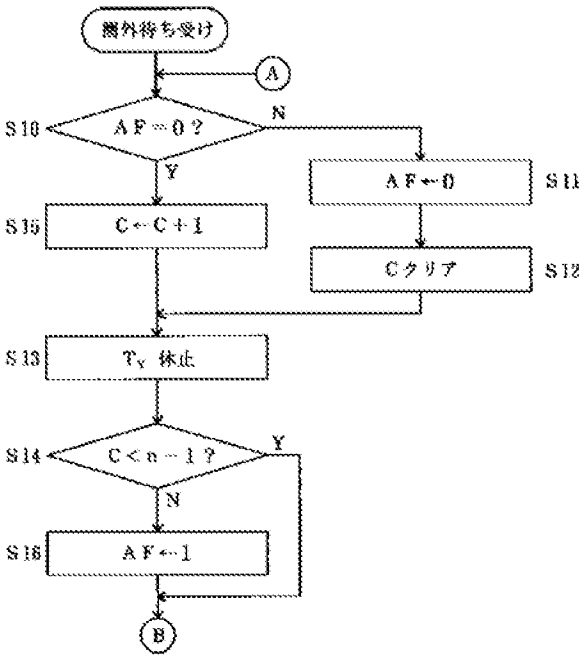
[Drawing 1]



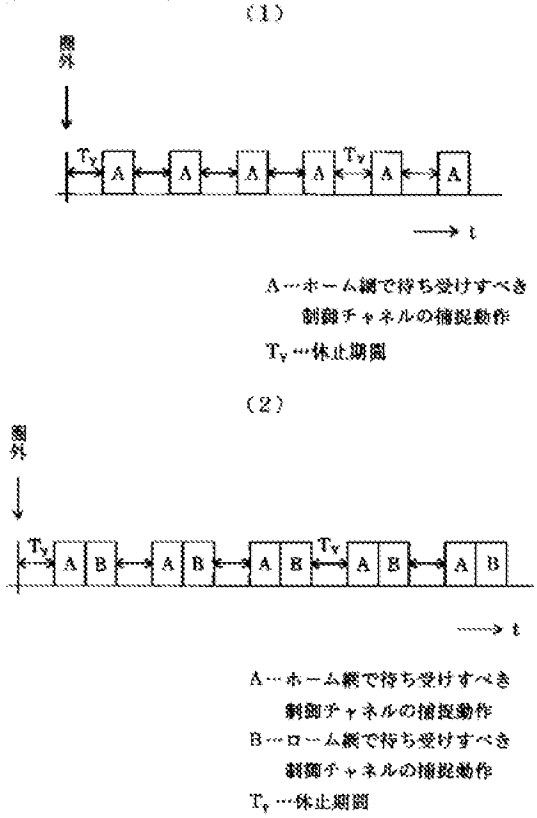
[Drawing 3]



[Drawing 4]



[Drawing 6]



[Translation done.]